

## What is claimed is:

1. A mixture comprising at least six chemical compounds each having a common purine or pyrimidine heterocyclic scaffold, said scaffold having at least two functionalizable atoms, said scaffold being substituted at at least one of said functionalizable atoms with a set of at least six different chemical substituents optionally connected to said heterocyclic scaffold by a tether moiety.
2. The mixture of claim 1 comprising at least ten chemical compounds.
3. The mixture of claim 1 comprising at least fifteen chemical compounds.
4. The mixture of claim 1 wherein said chemical compounds are within 20 mole percent of equimolarity in said mixture.
5. The mixture of claim 1 wherein said heterocyclic scaffold has at least three functionalizable atoms.
6. The mixture of claim 1 wherein said tether moiety is the same for each chemical substituent.
7. The mixture of claim 1 wherein at least one of the functionalizable atoms on said heterocyclic scaffold is nucleophilic.
8. The mixture of claim 1 wherein said tether moiety bears at least one functionalizable atom.

9. The mixture of claim 8 wherein at least one functionalizable atom on said tether moiety is nucleophilic.

10. The mixture of claim 8 wherein the at least one functionalizable atom on the tether moiety is substituted with a set of chemical substituents.

11. The mixture of claim 8 wherein the set of chemical substituents on the tether moiety are electrophilic.

12. The mixture of claim 1 wherein said chemical  
10 substituents are electrophilic.

13. The mixture of claim ~~1~~<sup>2</sup> wherein at least one functionalizable atom of said heterocyclic scaffold is chemically blocked.

14. The mixture of claim 1 wherein said chemical  
15 compounds are synthesized simultaneously in solution  
phase.

15. The mixture of claim 1 wherein said chemical compounds are synthesized simultaneously in solution phase through an interactive synthetic process.

20 16. The mixture of claim 1 wherein said process  
comprises the blocking and deblocking of at least one  
functionalizable atom of said heterocyclic scaffold.

17. The mixture of claim 1 wherein at least some of  
said chemical compounds are subsequently reacted with a  
25 further reactant.

18. The mixture of claim 17 wherein said further reactant reacts with the heterocyclic portion of the chemical compounds.

19. The mixture of claim 1 wherein the heterocyclic  
5 portion of said chemical compounds is ring-opened, ring-  
closed, ring-expanded, bicyclized or altered subsequent  
to said substitution at said at least one of said  
functionalizable atoms.

20. A mixture comprising at least six chemical  
10 compounds having a common purine or pyrimidine  
heterocyclic scaffold, said scaffold having at least two  
functionalizable atoms, said heterocyclic scaffold  
being substituted at one of said functionalizable atoms  
with a set of at least six different chemical  
15 substituents optionally connected to said heterocyclic  
scaffold by a tether moiety; said heterocyclic scaffold  
being substituted at a second functionalizable atom with  
the same or a different set of at least six different  
chemical substituents optionally connected to said  
20 heterocyclic scaffold by a tether moiety.

21. The mixture of claim 20 wherein at least one of said sets of chemical substituents comprises at least ten species.

22. The mixture of claim 20 wherein at least one of  
25 said sets of chemical substituents comprise at least  
fifteen species.

23. The mixture of claim 20 wherein at least some of the chemical substituents is connected to said scaffold by tether moieties.

